# **CHAPTER FOUR**

## **4. The Basic Economic Principles Applied in Farm Management**

Dear students, under this topic, you will be introduced to the basic economic principles which are applied in managing a given farm conditions.

Farm management principles serve as a guideline for collecting and using requisite information for rational decision making.

They also provide a set of tools for the preparation of farm budgets and production programmers. These principles help to provide answers to various farm problems and save time and energy otherwise lost in trials and errors to arrive at appropriate decisions. The following are some of the basic principles or laws involved in making rational farm management decisions.

1. The law of diminishing return
2. The law of equi-marginal return
3. The law of opportunity cost
4. The law of substitution
5. The law of comparative advantage
6. The principle of combining enterprises
7. **The Law of Diminishing Returns**:

Mean that a successive increase in the use of inputs, holding other factors constant, and the marginal product we get from each additional unit of input will eventually decline.

The law of diminishing marginal return is a phenomenon of a **short- run production function** and it is valid when the following conditions are satisfied:

1. The technology of production is fixed;
2. There is at least one fixed and one variable input in the process of production;
3. The fixed factor and the variable factor (input) are combined to produce output.

The last condition is essential and that is why the law is sometimes known as the **law of variable proportion**.

This is more general in scope because the law of diminishing return becomes universally valid even in the situation where the combined factors vary at different rates thus, giving us their variable proportions which in turn affects the total, average and marginal products of the variable inputs.

**Law of returns**: There are three laws of returns namely:

1. Law of increasing returns
2. Law of constant returns
3. Law of decreasing returns

Table2-1: Proportion of returns

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Units of inputs used (x) | Total product(y) | Average product (Ap) | Marginal product(MP) | ProportionateIncrease | Law of return |
| 1 | 8 | 8 | - | More | increasing |
| 2 | 20 | 10 | 12 |
| 3 | 36 | 12 | 16 | Equal | constant |
| 4 | 52 | 13 | 16 |
| 5 | 60 | 12 | 8 | Less | decreasing |
| 6 | 66 | 11 | 6 |

**TP (Total product)**: It is the amount of product produced by different quantities of the variable input used (other factors being constant).

**AP (average product)**: It is the total product divided by the numbers of units of the variable input used to produce that product. $AP=\frac{TP(Y)}{X}$

**MP (marginal product)**: It is the quantity which an added unit of the variable input adds to the total product. 

**Most Profitable level of production**

**(**a) How much input to use (Optimum input to use) - the determination of optimum input to use.

An important use of information derived from a production function is in determining how much of the variable input to use. Given a goal of maximizing profit, the farmer must select from all possible input levels, the one which will result in the greatest profit.

* To determine the optimum input to use, we apply two marginal concepts viz: Marginal Value Product and Marginal Factor Cost.
* Marginal Value Product (MVP): It is the additional income received from using an additional unit of input. It is calculated by using the following equation.
* Marginal Value Product = ∆ Total Value Product/∆ input level

 MVP= ∆ Y. Py/∆ X where ∆= Change Y =Output Py = Price/unit

* Marginal Input Cost (MIC) or Marginal Factor Cost (MFC): It is defined as the additional cost associated with the use of an additional unit of input.
* Marginal Factor Cost = ∆ Total Input Cost/ ∆ Input level

MFC or MIC = ∆ X Px/ ∆ X = ∆ X .Px / ∆ x = Px X input Quantity Px Price per unit of input

* MFC is constant and equal to the price per unit of input. This conclusion holds provided the input price does not change with the quantity of input purchased.

***Decision Rules:***

1. If MVP is greater than MIC, additional profit can be made by using more input.

2. If MVP is less than MIC, more profit can be made by using less input.

3. Profit maximizing or optimum input level is at the point where MVP=MFC **(∆ Y/ ∆ X). Py = Px ∆Y/∆ X = Px/ Py**

**b) How much output to produce (optimum output)**- Profit maximizing or optimum output level is at the point where MR=MC

1. **The Law of Equi - Marginal Returns:**

This is concerned with the allocation of the same amount of a limited resource among different enterprises. The laws states that yield are maximized by using a resource in such a way that the marginal returns from that resource are equal in all enterprises.

Table2-2: Total Product (TP) and Marginal Physical Product (MPP)

|  |  |  |
| --- | --- | --- |
| units of nitrogen(N) each unit =40kg | TP | MPP |
| Y1 Qt/ha | Y2 Qt/ha | Y1 Qt/ha | Y2 Qt/ha |
| 0 | 20 | 21 | - | - |
| 1 | 40 | 44 | 20 | 23 |
| 2 | **50** | 56 | **10** | 12 |
| 3 | 59 | **66** | 9 | **10** |
| 4 | 63 | 70 | 4 | 4 |
| 5 | 60 | 68 | -3 | -2 |

Let us assume that a farmer has 200kg of nitrogen with him to apply on Y1 andY2

**Q1. What amount of N is a farmer allotted for each variety to maximize his yield?**

From the Table2-2 you observed that, based on the law of equi marginal return, a farmer can maximize his yield in a point where the MP product he got from each variety is equal to 10. So by using 80kg of nitrogen for Y1 and 120kg of nitrogen for Y2; he finds that their marginal physical products are equal. Hence he gets the maximum yield of **116qt**.

1. **The Law of Opportunity Cost:**

An opportunity cost is the earning from the next best alternative scarified. It is foregone benefit mean that the benefit that you might have gained from choosing the next alternative. All activities that have a next best alternative have an opportunity cost. Opportunity cost is a measure of everything you sacrifice to attain a given objective.

**Example:** If a pair of bullock labour earns Br.20 per day on plowing, but it can also earn Br. 25 per day in the alternative employment of carting. The opportunity cost of plowing is Br.25 per day i.e. the value of the bullock labour in its best alternative use.

Table 2-3: Gross income basis, when costs are equal

|  |  |  |  |
| --- | --- | --- | --- |
| Enterprise | Gross income(Br.) | Cost of production(Br.) | Net income (Br.) |
| Maize | 3600 | 1000 | 2600 |
| Potato | 5600 | 1000 | 4600 |

The opportunity cost of growing maize is the gross income of Br.5600 which was scarified by not producing potato.

Table 2-4: Gross income basis, when costs are unequal

|  |  |  |  |
| --- | --- | --- | --- |
| Enterprise | Gross income(Br.) | Cost of production(Br.) | Net income (Br.) |
| Potato | 5600 | 1000 | 4600 |
| Wheat | 7000 | 1800 | 5200 |

The opportunity cost of growing potato is the net income of Br. 5200, which was scarified by not producing wheat.

1. **The Law of Substitution:**

The tendency that operates through the whole field of economics, in production, exchange and consumption is to replace the less efficient by the more efficient agent.

**Example; -** Substitute labour by machine

 - Substitute oxen power by tractor, e.t.c.

The law of substitution states that "when more than one means of producing a given result is known and available, **the least costly will be selected**. **Substitution rates**: substitution of one input for another or one product for another is expressed by marginal rate of substitution (MRTS).

**MRTS= --------** it shows that the number of units of X2 scarified for each unit increase in X1. In the same way, we deal with two products.

1. **The Law of Comparative Advantage:**

It is evident from the fact that farmers try to produce those commodities that maximize their net income. They normally include in their cropping scheme as large areas as possible of the most profitable crops to the area and for their particular farms. Hence, the determination of the type of farming is based on the principle of **Comparative advantage.**

The law of comparative advantage states that each region or country should specialize in the production of goods and services in which it has a **comparative advantage**. It means that the law of opportunity cost in terms of amounts of other goods and services that must be foregone in order to produce the good. No country has comparative advantage, no trade between them. A country should specialize in and export those goods for which it has a **comparative advantage**.

The concept of comparative advantage is associated with:

* Resource endowment
* Resource productivity
* Cost of production of enterprises

**Relative advantage is most easily illustrated as example with two countries and two goods.**

Here two crops, namely wheat and ground nut are considered.

Table2-6:Comparative advantage based

|  |  |  |
| --- | --- | --- |
| Crop-account | Region – A | Region – B |
| Ground nut (Br) | Wheat(Br) | Ground nut(Br) | Wheat(Br) |
| Total income per hectare | 13000.00 | 13000.00 | 11500.00 | 8000.00 |
| Total expenditure per hectare | 6000.00 | 8000.00 | 7000.00 | 6000.00 |
| Net income per hectare | 7000.00 | 5000.00 | 4500.00 | 2000.00 |

From the Table2-6, you will see that Region-A has a relative advantage in ground nut over that of ground nut in Region-B. But farmers in Region-B can make more profit by having largest possible area for ground nut relative to that under wheat.

From the Table2-6, you will also see that Region A farmers has a greater relative advantage in growing both wheat and ground nut than Region-B farmers, because the net income per hectare is greater as compared to Region-B.